Exhibit B

United States Fuel Resiliency

Volume III

U.S. Fuels Supply Infrastructure Vulnerabilities and Resiliency

FINAL REPORT

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Disclaimer

Data related to fuels supply and movements and descriptions of infrastructure were current at the time this report was prepared. The global and U.S. oil, natural gas, and refined products markets, supply patterns, and infrastructure are changing rapidly.

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I. Resiliency to TS&D Infrastructure and Supply Disruptions

A. Introduction

Volume I of this study characterized the nation's oil and natural gas transportation, storage, and distribution (TS&D) infrastructure. Volume II described and discussed the nature, probability, and supply impacts of various vulnerabilities of the TS&D infrastructure to natural disasters, physical and human threats, supply chokepoints, and system interdependencies. Industry, government leaders, and policy makers must also understand the ability of this infrastructure to recover from disruptions and the ability of the fuels TS&D system to meet the fuels demand of industrial, commercial, and private consumers in affected markets.

Vulnerability and Resiliency: Building on the information and data presented in Volumes I and II, Part III of this study evaluates the ability of the TS&D system to respond to and recover from natural disasters and intentional acts, system chokepoints and interdependencies, and other supply interruptions, such as external market distortions or political acts.

For the purpose of this analysis, "resiliency" is considered in several ways:

- Infrastructure resiliency refers to the amount of time it takes to restore a damaged element of infrastructure to operations.
- Supply resiliency refers to the ability of the overall system to ensure the adequacy of fuels supply to markets affected by infrastructure or supply disruptions, regardless of cause.

Natural Disasters and Threats: Recent high-profile natural disasters like Hurricane Sandy, Hurricane Katrina, the 2012 Mid-Atlantic Derecho, and the 2013-2014 Polar Vortex event have tested regional fuel resiliency along the Gulf Coast, in the Midwest, and on the East Coast.

- The hurricanes flooded refineries and petroleum terminals, shut down pipelines, sank offshore platforms, and disrupted transportation.
- The derecho knocked out power to millions, created local gas shortages, and brought prolonged restoration times.
- The most recent polar vortex event shut in production at wells, caused chaotic winter storms throughout the South, and created propane and natural gas shortages in the North, leading to price spikes and emergency imports from Europe.

These natural disasters provided valuable lessons in infrastructure and fuel supply resiliency.

Volume II of this study provided a comprehensive look at nine types of natural disasters that could disrupt fuel supplies in the United States and thereby threaten both the economy and the nation's security. These threats, and their primary effects based on past events, are shown in Table 1 and Figures 1and 2 below. The table highlights the key issues that need to be addressed in regional fuel resiliency.

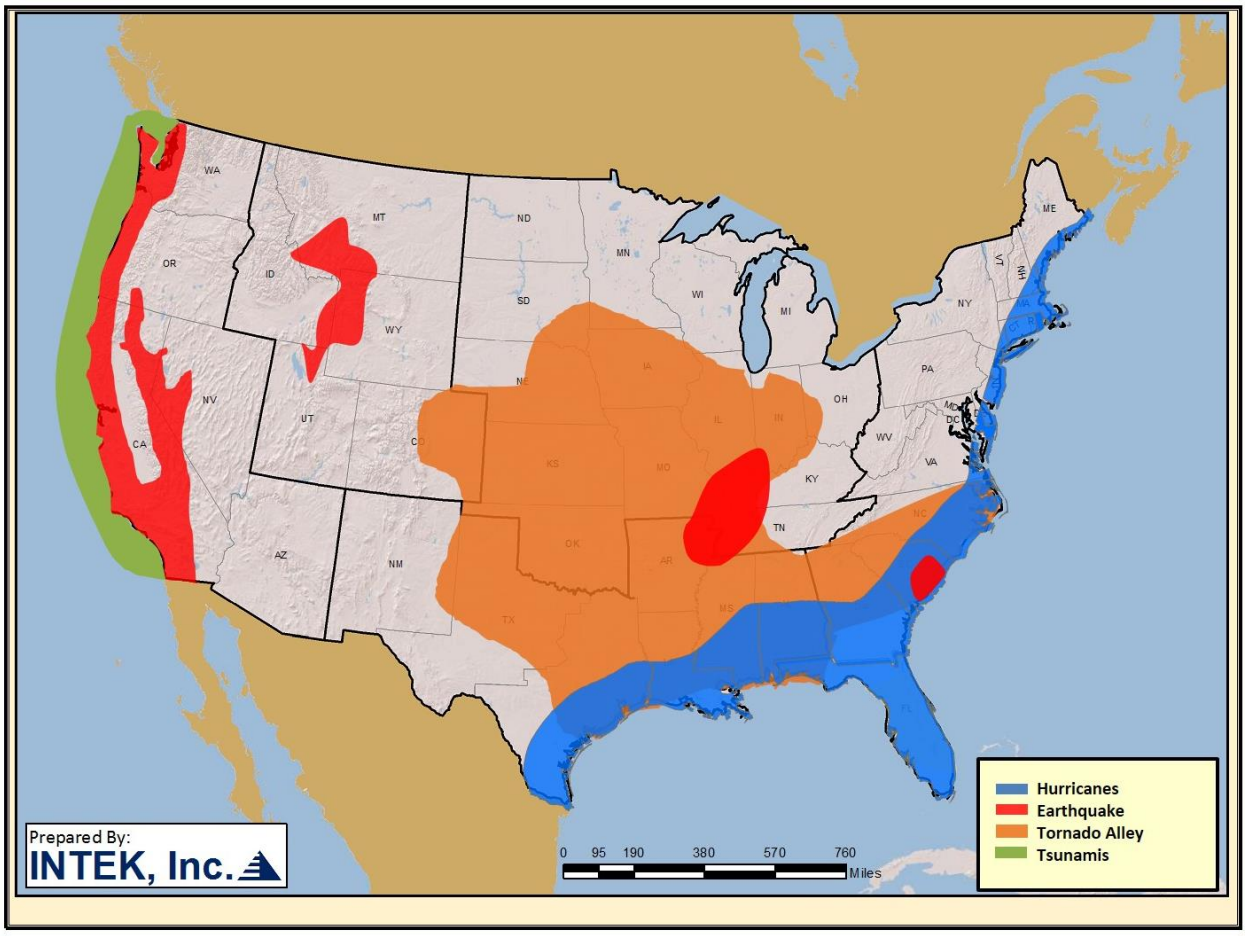
Table 1: Summary of Potential Natural Disaster Impacts on TS&D Infrastructure

Natural Disaster	Effects	Likely Impacts on Fuel Supply
Hurricanes	Wind damage, storm surges, flooding	Refineries and gas processing plants shut down, terminals flooded and inaccessible, pipelines (particularly Colonial and Plantation) shut down, large production losses in the Gulf of Mexico, and closure of major ports.
Earthquakes	Ground displacement, structural damage	Possible extensive damage to pipelines, ports, refineries, and terminals. Possible isolation of major West Coast markets.
Tsunamis	Massive coastal flooding, structural damage	Disruption of imports, damage to coastal terminals and rail lines. Massive local shortages in devastated areas.
Tornadoes	Extreme wind and debris impact damage	Low probability of infrastructure impact due to the disaster's extreme localization. Wells destroyed, refinery cooling towers destroyed, terminals heavily damaged.
Heat Waves /Droughts	Damage due to sagging, buckling, and kinking; agricultural losses	Insignificant transportation disruptions due to kinking and low river levels. Major ethanol feedstock loss. Water restrictions might affect refineries and fracking operations.
Derechos	Wind damage, flooding, and lightning	Local distribution affected due to widespread power outages. Insignificant wind and lightning damage to terminals, pumping stations, and refineries also possible.
Wildfires	Fire damage	Insignificant impacts on infrastructure due to typically rural fire locations and experienced mitigation efforts.
Polar Vortex	Prolonged freezing temperatures, equipment malfunctions, and transportation disruptions	Wellhead freeze-off leading to production losses. Constrained natural gas and propane supplies due to high consumption rates. Insignificant equipment malfunctions at refineries, terminals, and pumping stations.
Flooding	Flooding, erosion, debris impact damage	Damage to terminals and refineries in flood zones. Possible widespread ethanol feedstock loss.

Due to the variable climate and vast geography of the United States, certain natural disasters occur in or impact certain regions with much greater frequency and severity than others. Therefore, regional fuel

resiliency will largely depend on the nature and variety of threats faced by a given region. A generalized schematic of regional threats is provided in Figure 1.

Figure 1: Major Natural Disaster Hazard Regions in the Continental U.S.

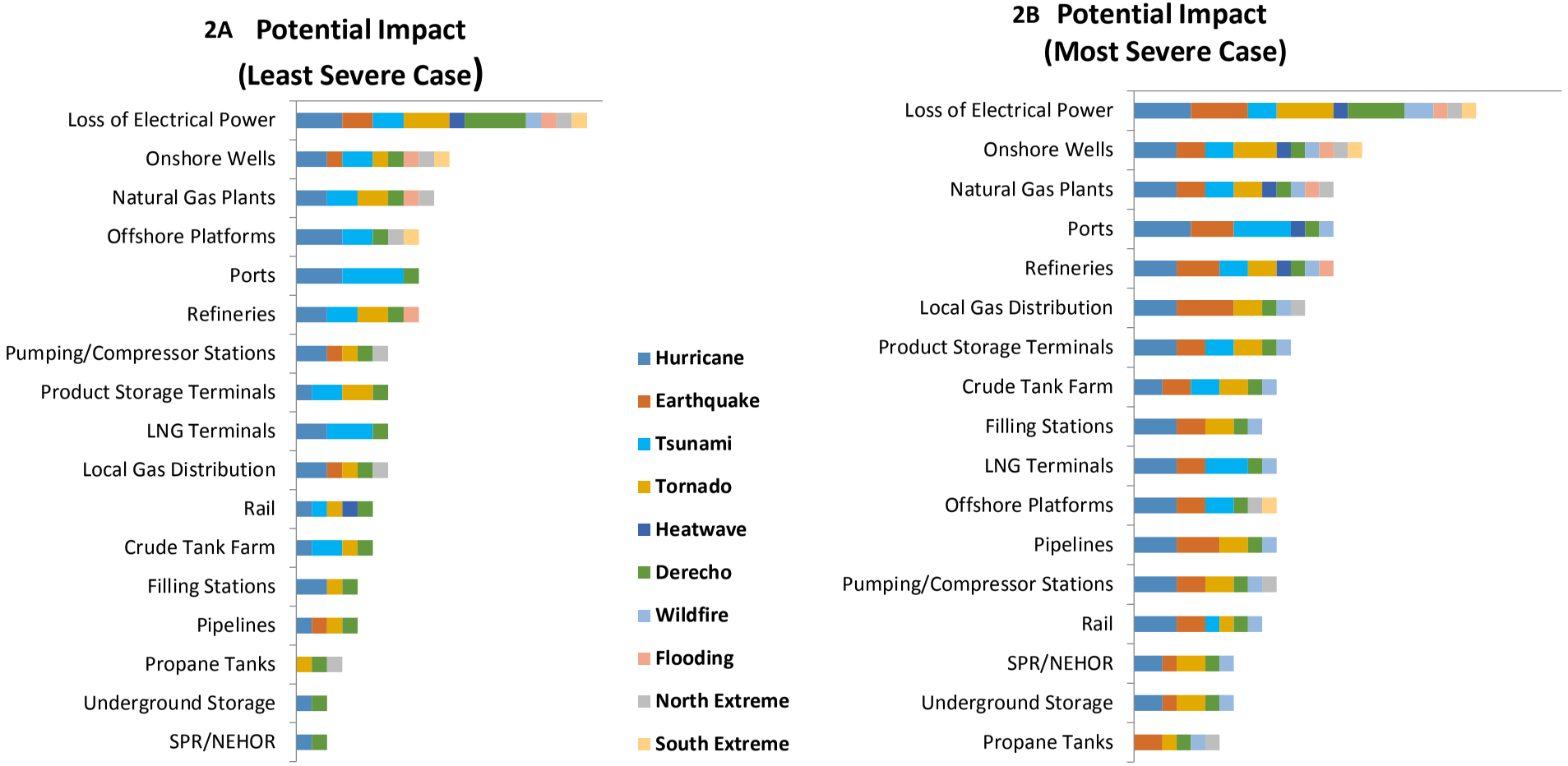


The relative vulnerability of various types of infrastructure to the full range of potential natural disruptions is reflected in Figures 2A and 2B. Figure 2A ranks infrastructure according to its the vulnerability to the least severe instances of specific types of natural disasters (excluding insignificant damage), and Figure 2B ranks infrastructure vulnerability to the most severe instance of such damaging events. While electric power deliverability ranks the highest, regardless of event severity, the relative vulnerability of other fuels supply infrastructures varies somewhat with event severity.

The frequency and severity of natural disasters, and the vulnerability of specific type of fuels supply infrastructure, also vary regionally.

Physical and Human Threats: Supply disruptions can come in the form of physical or humans threats, either through intentional malice (terrorism, criminal acts, sabotage) or unintended error (accidents, mismanagement, equipment failure), that disrupt infrastructure. While there have not been any recent physical attacks on oil and gas systems, accidents can also cause disruptions. Most are localized and temporary. Some, however, such as the BP Horizon Oil Spill in the Gulf of Mexico or the Lac-Megantic oil train derailment in Quebec, were severe enough to cause regional and national consequences.

Figure 2: Relative Vulnerabilities of Fuels Infrastructure Types for Various Event Severities



Human threats can also include politically or economically motivated supply disruptions such as embargoes. While domestic and global fuels markets have changed dramatically in recent decades, the continued dependency of the United States and some PADDs in particular, on crude oil and refined petroleum product imports, underscores the essential need to be able to respond to a disruption of foreign sources of supply.

Regional Supply Balances, Dependencies, and Resiliency: The United States is vast, with diverse geographic, climatological, political, and economic regions and sub-regions. Some regions, such as the Gulf Coast, are major producers and suppliers of oil, natural gas, or refined products. Others are almost wholly reliant on natural gas and refined products supplied by other regions. Understanding the oil, refined product, and natural gas supply and demand balances of each of the major PADDs provides insight in to the criticality of the infrastructure that serves each PADD and the other PADDs that it supplies or upon which it is dependent. These balances are illustrated statistically in Section II. The flows of crude oil, products, and natural gas between PADDS and Sub-PADDs are illustrated graphically in the regional discussion of vulnerabilities, dependencies, and resiliency that follows. Section III of this report describes each PADD and Sub-PADD in terms of its infrastructure vulnerabilities and dependencies, supply resiliency, and deficiencies, and offers options and recommendations for consideration by policy makers to address these needs.

SPR and Other Government Reserves: Supply resiliency is achieved in two primary ways. The first is in the stocks of crude oil, refined products, propane, and natural gas that are maintained in storage by industry to meet the changing demands of consumers. The second is the reserves of crude oil and refined products that have been established by the U.S. Government which serve to respond to interruptions in crude oil supply to domestic refiners and ensure adequate supplies of home heating fuels, or motor fuels, in areas that are most vulnerable to supply disruptions or sharp peaks in demand. Section IV of this volume describes the capabilities, limitations, and potential enhancements of the nation's Strategic Petroleum Reserves (SPR), Northeast Home Heating Oil Reserve (NEHHOR), and Northeast Regional Refined Petroleum Product Reserve (NERRPPR) to address supply resiliency requirements.

Federal and State Energy Assurance Plans: Infrastructure and supply resiliency is not, however, the sole province of the Federal government. Building on the lessons learned from past events, including Gulf Coast Hurricanes, East Coast Hurricanes, West Coast earthquakes, tornados, derechos, distortions to the Polar Vortex, and other supply disruptions, many state and even local governments have begun to develop and implement energy assurance plans that define public and private procedures, requirements, and policies for responding to energy supply disruptions. These plans, where public and available, are summarized in Section V of this volume.

Resiliency Stress Tests: It is not sufficient to understand the potential impacts of infrastructure and supply disruptions from a qualitative and descriptive perspective. It is critically important to assess the potential supply loss from such events in order to assess the true resiliency of the TS&D system to meet national and regional needs when an event occurs. Section V of this volume presents the results of a series of "stress tests" that were conducted to evaluate resiliency under a variety of interruption scenarios. These stress tests range from hurricanes of various intensities making landfall at various

locations, disruptions of crude oil exports to U.S. or global markets from sources in the Middle East, Africa, or South America, or loss of supply from Russia to global markets.

Fuel Resiliency Options for Policy Makers: A range of near-term and longer term options are available to policy makers for actions that can reduce vulnerability or improve resiliency of the TS&D infrastructure in the United States. These options relate to one or more of three major strategies:

- **Hardening: Encouraging, expediting, or facilitating hardening** or strengthening of the physical infrastructure to make it less vulnerable to damage by natural disasters or intentional acts.
- **Preparedness** to respond to supply interruption events, when they occur, through the establishment of plans, procedures, and capabilities that facilitate and expedite infrastructure and fuels supply recovery
- **Supply replacement** strategies to expeditiously provide alternative or back-up sources of fuels stocks to bridge the supply interruption until such time as damaged infrastructure and interrupted fuels production or transport operations can be restored to pre-event levels.

Much of the relevant TS&D infrastructure is privately owned and maintained. As such, the government's role in hardening and preparedness may be to encourage and incentivize industry to act, facilitate cooperation and interaction among industry participants, facilitate industry and governmental interactions, support research, technology development and application, and facilitate and expedite fuels-related emergency preparedness and response activities.

Where infrastructure is publicly owned and maintained, such as coastal and inland waterways, locks and navigation systems, or crude and refined product stocks and reserves, government's roles in assuring supply resilience are broader. These roles may include maintaining operability of physical infrastructure, conforming the composition of stocks to market requirements, and maintaining effective distribution and deliverability capabilities.

Options for improving resiliency are presented at the Sub-PADD level in Section III of this volume. Section VIII of this report summarizes the options and recommendations identified in the foregoing sections of this volume to provide a concise set of options and recommendations for consideration by policymakers.

II. Regional Fuels Supply Dependencies

This section describes the crude oil, refined product, and natural gas supply, demand, and movements for each PADD. The products considered in this section are: motor gasoline (including blending components and fuel ethanol), distillates (including ultra-low sulfur diesel (ULSD) and heating oil), and kerosene type jet fuel. Propane is considered separately. The section also describes the major pipeline, rail, and barge movements of crude oil, products, and natural gas in and out of the PADD.

A. Crude Oil

Crude oil is the essential feedstock used to produce refined products such as motor fuels, distillates, propane, and other petroleum products. An analysis of the 2013 crude oil production and consumption was conducted (Table 2) to determine the supply and demand balances for crude oil, refined products, and natural gas at the PADD level.

Table 2: 2013 Crude Oil Supply and Demand (MBbl/d)

	PADD I	PADD II	PADD III	PADD IV	PADD V
Demand	**1,038**	**3,406**	**7,952**	**578**	**2,339**
Local Supply	**38**	**1,394**	**4,382**	**525**	**1,111**
Balance	**(1,000)**	**(2,012)**	**(3,570)**	**(53)**	**(1,228)**
External sources of crude to meet the balance					
Other U.S.	38	1,154	541	70	
Canada	214	1,796	128	247	193
Rest of the World	573	43	3,636		902

Source : EIA Data

This analysis, based on EIA data, revealed several key observations:

- PADD III (Gulf Coast and Southwest) is the largest and most complex refining center in the United States and is home to nearly half of the nation's refining capacity. Less than half of PADD III's crude oil demand is met by local sources. In 2013, approximately 70% of all non-Canadian oil imports into the U.S. were received in PADD III.

- PADD I (East Coast) accounts for 32% of the total U.S. refined product demand but only 6% of the refining. PADD I is highly dependent on PADD III for its refined products. PADD I is highly dependent upon foreign crude oil imports to supply its refineries.
- PADD V (West Coast) produces less than 50% of the crude needed by local west coast refineries. The physical difficulty in sending crude from other parts of the nation leaves PADD V refineries heavily reliant upon imported oil from South America, Africa, and the Middle East.
- PADD II (Midwest) produces only 40% of the crude oil required by its refineries. Nearly half of its demand is met by imports from Canada. The remainder comes from other PADDs. Incoming Canadian heavy oil production is pushing out crude oil imports from other foreign sources.
- PADD IV (Rockies) has the smallest concentration of refining in the U.S. It is dependent upon local sources and Canadian imports to meet demand.

B. Products

Crude oil is refined into fuels products – motor gasoline, jet fuel, distillates, and others – which literally drive the nation and the economy. There is an imbalance in the volume of product demanded and the volume of refined products produced (including motor gasoline, motor gasoline blending components, distillates, jet fuel, and fuel ethanol) among the nation's PADDS. While some regions have product deficits, they are offset by the surpluses in other regions or from imports. Products are also exported from the U.S. Gulf coast and swapped for transportation fuels that are needed in the United States.

Table 3: 2013 Product Supply and Demand (MBbl/d)

	PADD I	PADD II	PADD III	PADD IV	PADD V
Demand	**4,218**	**3,699**	**2,468**	**569**	**2,361**
Local Supply	**976**	**3,881**	**7,321**	**536**	**2,237**
Imports	730	10	44	1	72
Exports	117	47	1,497	0	209
Balance = (Local supply + Imports) – (Demand + Exports)					
Balance	**(2,629)**	**145**	**3,400**	**(31)**	**(260)**

Source: EIA Data

An analysis of the volumes produced and consumed in each PADD in 2013 (Table 3) has led to several key observations:

- PADD III is the largest source of refined products in the United States. It produces 50% of the total supply for the nation. Production in the region far exceeds local demand PADD III demand.

[Pages Omitted]

The Mid-Atlantic region and its fuels infrastructure is subject to cold harsh winters, East Coast storms and hurricanes, coastal flooding, and intense squalls and derechos. Its critical role in the nation's economy and leadership also makes this region's energy infrastructure an attractive potential target for intentional damage (Table 8).

Sub-PADD IB receives and refines both domestic and imported crude oil through its marine ports and terminal systems. It also receives, stores, and distributes large quantities of refined products by pipeline and marine terminals from PADD III that are consumed in the region and in New England.

This region is also dependent on the fuel supplies and infrastructure of adjacent regions, Sub-PADD IC and PADD III, and on seaborne imports (Table 9). An interruption of infrastructure, crude oil, or products supply would have to be offset by stocks in storage or alternative sources or modes of supply, the failure of which could have significant human, market, and economic impacts.

Sub-PADD IB is now a large producer of natural gas, but it also receives and distributes gas from PADDs II and III. Approximately 90% of NGL's are supplied to New York, Delaware and Pennsylvania refiners and distributors from PADDs II and III or imports from Canada, via pipeline, rail, and barge.

Table 8: Vulnerabilities and Chokepoints in Sub-PADD IB

States: Delaware, Maryland, New York, New Jersey, Pennsylvania (and Washington, D.C.)
Vulnerabilities and Threats **Direct:** • **East Coast Hurricane:** A hurricane could cause power loss at refineries, terminals, pipelines, and storage facilities (northern New Jersey, the New York Harbor area, the Philadelphia and Wilmington areas, and Baltimore Harbor); cause refinery shutdowns; interrupt crude supply to refineries; flood terminals; and disrupt the receipt, transport, and distribution of refined products. • **Polar Vortex:** Excessive cold, heavy snows, and ice associated with Polar Vortex conditions can result in power loss to refineries, pipelines and terminals; malfunctions of instrumentation, controls, and communications; and disruption of road, rail, and other transportation infrastructure. Freeze-offs of natural gas wellheads can interrupt gas production and supply.
• **Coastal Flooding:** Coastal flooding from hurricanes or major storms can flood coastal refineries, marine terminals, and storage facilities and damage and obstruct surface transportation routes and infrastructure, including roads and rail. Bridges and pipeline river crossings may also be impacted. • **Derechos:** These intense, localized, and short duration storms can cause short-term power loss to TS&D infrastructure, as well as wind and lightning damage. Most damage can be repaired quickly. • **Intentional Damage:** Much of the critical TS&D infrastructure in PADD IB is geographically concentrated, visible, and potentially accessible from major and ancillary transportation routes, making it vulnerable to intentional damage. Damage from an isolated small scale event could be quickly repaired with minimal impact on stocks and supplies.

Indirect:

- **Gulf Coast Hurricane:** A Gulf Coast hurricane in PADD III would cause no direct danger to PADD IB infrastructure, but refinery shutdowns or infrastructure damage in PADD III could interrupt or reduce the flow of products from PADD III to PADD I markets.

Market Effects: Short term product price spikes could result from refined product shortages.

Other Threats/Disruptions

- Any disruption of NYH infrastructure, system interconnections, associated power or communication systems, or crude or product deliveries could impact Sub-PADD IB supplies, markets, and deliveries to Sub-PADD IA.

Chokepoints

- Crude and Products: Linden, NJ marine terminals, pipeline interconnects (Buckeye & Colonial product pipelines), and waterways serving regional refineries are major chokepoints.
- Natural Gas: The Columbia Gas Transmission System's market hub is a gas system chokepoint.

Table 9: Major Infrastructure Dependence and Resiliency in Sub-PADD IB

IB	Major Infrastructure Dependence	Fuel Resiliency
Crude Oil	• The Philadelphia and New York Harbor areas contain critically important crude oil terminals and refineries. • Crude oil is sourced from PADD II, Canada, and other countries. • Most crude oil is received by waterborne transport (tankers and barges) at marine terminals associated with the major refineries. • The Buckeye Global terminal in Albany, NY receives Bakken crude oil by rail from PADD II West and ships it by barge to New York Harbor area refineries. • Philadelphia refineries receive Bakken crude by rail.	• To date, PADD IB East Coast refineries have never suffered a shortage of crude oil supply sufficient to curtail operations. Stocks in storage have always been sufficient to meet requirements, even during major hurricanes Irene and Sandy. • In the event of an import disruption, the SPR can supply crude from PADD III. However, the lead time for marine transport is approximately 2-3 weeks and requires U.S. flag tankers. • There is a current shortage of such Jones Act vessels, so Jones Act waivers could be required.
Refined Fuels	• The New York Harbor area contains critically important refined product storage and distribution infrastructure for both PADDS IA and IB. It receives products from other PADDs via the Colonial and Sun pipelines. Major ports receive imports and distribute products to PADDs IA and IB, using a complex infrastructure of pipelines, storage tanks,	• **East Coast Hurricane:** Refined products could be shipped from PADD III by marine vessels, but would require 10-14 days and Jones Act waivers. • **Gulf Coast Hurricane:** Local stocks may be depleted in 3-5 days. Refinery or pipeline recovery to provide products to PADD IB via Colonial and Plantation pipelines could require up to 2 weeks.